

Appl. No. 09/977,069
Amdt. dated May 23, 2003
Reply to Office Action of February 25, 2003

PATENT

REMARKS/ARGUMENTS

This Amendment is responsive to the Office Action mailed on February 25, 2003. This Amendment is being filed concurrently with a Request for Continued Examination (RCE). Entry of this Amendment is requested.

Prior to this Amendment, claims 6-20 were pending and subject to examination. In this Amendment, claims 6, 7, 9, 10, 13, 14, and 17 are amended, and claims 12 and 20 are canceled so that claims 6-11, and 13-19 are pending and subject to examination.

On April 22, 2003, an interview between Examiner Kielen and the undersigned took place. The undersigned sincerely appreciates the Examiner's careful consideration of the arguments made by the undersigned.

The Examiner makes a number of rejections in the Office Action. Each of the rejections will be addressed in the order presented in the Office Action.

Editorial changes are also made to the specification. New Figures 4-6 are added in response to the Examiner's objection to the drawings at page 3 of the Office Action. FIGS. 4 and 6 are from FIGS. 1 and 3 of U.S. Provisional Patent Application No. 60/240,109, which is herein incorporated by reference in its entirety at paragraph [01] of the present application. FIG. 5 is supported by, for example, paragraph [19] of the application. The corresponding text for FIGS. 4-5 is also derived from the U.S. Provisional Patent Application No. 60/240,109. No new matter is added, and entry of the new Figures and withdrawal of the objection at page 3 of the Office Action is requested. Applicants will submit formal drawings in due course.

Schnur et al.

Claims 6-8, 10, and 12 were previously rejected as anticipated by Schnur et al. (U.S. Patent No. 5,079,600).

Schnur et al. describes a process for producing metal plated paths on a solid substrate, while using a self-assembling film that is chemically absorbed on the substrate's surface. A catalytic precursor which adheres only to those regions of the film and has enough reactivity to bind the catalyst is applied to the film's surface. The catalyst coated structure is

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then immersed in an electroless plating bath where metal plates onto the regions activated by the catalyst. See abstract.

Schnur et al. fails to anticipate each and every limitation of independent claims 6 and 13. A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987). Schnur et al. does not anticipate independent claims 6 and 13, because Schnur et al. fails to teach a semiconductor device comprising, *inter alia*, (b) a diffusion barrier, wherein the diffusion barrier comprises a self-assembled monolayer including a plurality of molecules, each molecule having an aromatic group at the terminus of the molecule; and (c) a metal layer comprising copper on the diffusion barrier, "wherein for each molecule in the plurality of molecules, the copper in the metal layer is in direct contact with the aromatic group of the molecule" (emphasis added.).

Although the Examiner notes that Example 24 in Schnur et al. mentions "copper", Example 24 eventually refers to Example 9, which states that a colloidal Pd/Sn catalyst is applied to the ends of dichlorosilane molecules, and that copper is deposited on the catalyst. As shown on the cover page of the Schnur et al. patent, a "catalyst" is between "metal" and the terminal groups of silane molecules which are attached to the surface of a solid substrate (c. 10, lines 48-65). The catalyst is a palladium-tin colloid, which can cause electroless metal deposition in areas of a substrate to which the catalytic precursor has been attached (c. 7, l. 60-65). In Schnur et al., any copper that is deposited is not in direct contact with the terminal ends of the molecules that form Schnur et al.'s self-assembled film. Accordingly, Schnur et al. does not anticipate independent claim 6 and 13 (and any claims dependent thereon).

Schnur et al. and Wolf et al.

Claims 9, 11, and 13-20 were rejected over Schnur et al. in further view of Wolf, et al. This rejection is also traversed.

It would not have been obvious to modify Schnur et al. to remove the palladium-tin catalyst. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching,

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suggestion, or motivation to do so. If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 221 USPQ 1125 (Fed. Cir. 1984). Here, an "object" of Schnur et al.'s invention is to produce "printed circuits utilizing relatively non-hazardous aqueous electroless plating solutions" (c. 6, l. 7-12). In order for the electroless plating process to work, the Pd/Sn catalyst described by Schnur et al. must be between any electrolessly plated metal (e.g., copper) and the terminal ends of Schnur et al.'s self-assembled monolayer. As is well known in the art of electroless plating, Pd/Sn acts as a seed material, and this seed material is necessary to start an electroless plating process (see, for example, c. 1, l. 24-47 of Calvert et al., U.S. Patent No. 5,389,496). There is no motivation to remove Schnur et al.'s Pd/Sn catalyst and substitute it with, for example, copper, or else Schnur et al.'s electroless plating process would not work as intended by Schnur et al. Accordingly, the obviousness rejection is improper and withdrawal of the same is requested.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,



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